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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/569,167

10/24/2006

Keiichi Tanaka

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EXAMINER

WHITESSELL GORDON, STEVEN H

ART UNIT

PAPER NUMBER

2882

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/569,167	<b>Applicant(s)</b> TANAKA, KEIICHI	
	<b>Examiner</b> Steven H. Whitesell-Gordon	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 February 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 4,7,10 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,5,6,8,9 and 11-13 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/24/06</u> . | 6) <input type="checkbox"/> Other: _____  |

### DETAILED ACTION

1. Applicant's election without traverse of Group 1, including claims 1-3, 5, 6, 8, 9 and 11-13, in the reply filed on 8 February 2010 is acknowledged. Claims 4, 7, 10 and 14 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected Group II, there being no allowable generic or linking claim.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1, 2, 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tichenor et al. [US 6,031,598] in view of Tanaka [WO 01/22480, previously cited, see translation for reference].**

**For claim 1**, Tichenor teaches a vacuum apparatus comprising a plurality of components (components found in reticle, optical and wafer zones, see Fig. 11 and col. 8 lines 7-32) that are operated in a vacuum (in vacuum, see col. 8 lines 7-10), a plurality of inner chambers (three zones defined by inner wall section 77, and three zones, see Fig. 6 and 11 and col. 7 lines 11-167 and col. 8 lines 7-9) that respectively accommodate these individual components, an outer chamber (2) that accommodates the plurality of inner chambers as a whole, and exhaust means (24, 26 and 28 shown in

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Fig. 1 and means for providing vacuum in reticle zone, projection zone and wafer zone) installed in the respective inner chambers and the outer chamber.

Tichenor does not disclose bellows that connect these respective inner chambers.

Tanaka teaches bellows (34 and 36, see Fig. 1) that connect these respective inner chambers.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the bellows of Tanaka in the apparatus as taught by Tichenor, because as taught by Tichenor in col. 8 lines 20-22, there should be no transmission of vibrations between the inner chambers, accordingly the bellows of Tanaka would allow for reducing the transmission of vibrations between the inner chambers.

**For claim 8**, Tichenor teaches an exposure apparatus comprising a lens barrel (102, see Fig. 11) which accommodates a projection optical system (102 is projection optics box) that projects a pattern on an original plate (48, see col. 8 lines 7-24) onto a sensitive substrate (54), an original plate stage (70) which moves and positions this original plate, a sensitive substrate stage (74) which moves and positions the sensitive substrate, a plurality of inner chambers (three zones defined by inner wall section 77, and three zones, see Fig. 6 and 11 and col. 7 lines 11-167 and col. 8 lines 7-9) which respectively accommodate the original plate stage (reticle zone) and the sensitive substrate stage (wafer stage zone, an outer chamber (2) which accommodates the plurality of inner chambers and the lens barrel, and exhaust means (24, 26 and 28

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shown in Fig. 1 and means for providing vacuum in reticle zone, projection zone and wafer zone) installed in the respective inner chambers and the outer chamber.

Tichenor does not disclose bellows which connect these respective inner chambers and the lens barrel.

Tanaka teaches bellows (34 and 36, see Fig. 1) which connect these respective inner chambers and the lens barrel

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the bellows of Tanaka in the apparatus as taught by Tichenor, because as taught by Tichenor in col. 8 lines 20-22, there should be no transmission of vibrations between the inner chambers, accordingly the bellows of Tanaka would allow for reducing the transmission of vibrations between the inner chambers.

**For claim 2**, Tichenor teaches exhausting the reticle zone, projection optics zone and wafer zone, see col. 5 lines 10-37, but does not explicitly disclose this apparatus has piping that runs to the outside of the apparatus from the inner chambers, and the portions of this piping that reach the outer chamber from the inner chambers consist of a thin, flexible piping material.

Tanaka teaches piping (56, see Fig. 1) that runs to the outside of the apparatus from the inner chambers, and the portions of this piping that reach the outer chamber from the inner chambers consist of a thin, flexible piping material (see col. 54 lines 8-24).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the flexible piping as taught by Tanaka in the combination of Tichenor and Tanaka, because the flexible piping could allow for providing a vacuum to specific locations within the apparatus as taught by Tichenor col. 5 lines 10-37, while also allowing for variations in the spacing between the inner chamber, reducing the likelihood the piping providing the vacuum would rupture during variation in position of the chambers.

**Fro claim 12**, Tichenor teaches the apparatus further comprises a body (60) that supports the lens barrel, original plate stage and sensitive substrate stage on the building floor (8) and a stage measurement reference device attachment member (metrology plates 90 and 96) that is supported on this body, and an anti vibration stand (84) is installed at least between the body and the building floor or between the body and the lens barrel (between 102 and 60, see Fig. 7 and 11).

4. **Claims 3, 6, 9, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tichenor in view of Tanaka as applied to claim 1 above, and further in view of Dyer [US 6,288,357].**

**For claims 3, 6, 9, 11 and 13**, Tichenor teaches operation of the a vacuum system during exposure, or operation of components in the respective chamber (see col. 6, lines 41-52) does not explicitly disclose the exhaust means installed in the inner

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chambers has a vibration-free type vacuum pump and a vibrating type vacuum pump that are installed in parallel.

Tanaka teaches an exhaust means installed in the inner chambers has a vibrating type vacuum pump (dry pump 68 and TMP 66, see page 55, lines 13-23).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the exhaust means to the inner chamber including a vibrating pump as taught by Tanaka in the combination of Tichenor and Tanaka , because this pump system could allow for greatly reducing the pressure in the exposure, reducing the likelihood of large particles that could attenuate the exposure beam.

Tichenor as modified by Tanaka above does not explicitly disclose a vibration-free type vacuum pump and a vibrating type vacuum pump that are installed in parallel the vibration free type vacuum pump is operated during the operation of the components.

Dyer teaches a vibration-free type vacuum pump (170, see Fig. 1) and a vibrating type vacuum pump (160), contamination removal means (re claim 11, cryopump 160 works to remove contamination) are installed in the respective inner chambers, that are installed in parallel (in parallel to chamber evacuated see Fig. 1) and the vibration free type vacuum pump is operated during the operation of the components (see col. 4 lines 1-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the a vibration-free type vacuum pump as taught by Dyer in parallel with the vibrating type pump in the combination of Tichenor and Tanaka, because this could allow for the providing a backup to a roughing pump in case of a power failure, reducing the likelihood of damage to the system such as re-introduction of contaminants to the system.

**5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tichenor in view of Tanaka and Dyer as applied to claim 3 above, and further in view of Box et al. [US 7,274,431].**

**For claim 5**, Tichenor as modified by Tanaka and Dyer does not teach the respective components and the vibration-free type vacuum pump inside the inner chambers are in a positional relationship which is such that these parts do not face each other, a heat-blocking plate is disposed between these components and the vibration free type vacuum pump inside the inner chambers, and the surface of this heat blocking plate on the side of the components is a mirror finish metal surface.

Box teaches the respective components and the vibration-free type vacuum pump (7, see col. 8 lines 37-39 and Fig. 2) inside the inner chambers are in a positional relationship which is such that these parts do not face each other (cryopanel 7 do not face MA or PM, see Fig. 2), a heat-blocking plate (6) is disposed between these components and the vibration free type vacuum pump inside the inner chambers (see



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Fig. 2), and the surface of this heat blocking plate on the side of the components is a mirror finish metal surface (metal layer, see col. 10 lines 25-50 and col. 11 lines 6-9).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the position of the vibration-free pumps with heat blocking plates as taught by Box in the combination of Tichenor, Tanaka and Dyer, because this could allow for maintaining a high vacuum in the exposure area while reducing the likelihood that the heat generation by the vibration-free pumps would not deform the reticle or wafer during exposure.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Haney et al. [US 6,333,775] teaches an apparatus with multiple chambers for exposure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Whitesell-Gordon whose telephone number is (571) 270-3942. The examiner can normally be reached on Monday to Thursday, 9:00 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward J. Glick can be reached on (571) 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. H. W./  
Examiner, Art Unit 2882

/Edward J Glick/  
Supervisory Patent Examiner, Art Unit 2882